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Remarks

Claims 1-20, 22-38, 40, 42-47, 49, and 50 are pending in the application. Claims 1, 22, and 40 are amended. Claims 21 and 39 are canceled and rewritten as new independent claims 49 and 50, respectively. Paragraph [0006] has been amended. No new matter has been entered. The rejections and objections are respectfully traversed.

Informalities

The examiner objects to paragraph [0006], due to the use of the word "powder mixture". The examiner asserts that the phrase "powder mixture" requires at least two powders, wherein only one powder is recited for the powder mixtures in paragraph [0006]. To overcome the objection of paragraph [0006] for informalities, "powder mixture" has been removed from paragraph [0006]. In light of the amendments, the objection should be removed.

Rejections under §112

Similar to the objection above, amended claim 40 is rejected under §112, ¶ 1 for only defining one powder in the "powder mixture". Moreover, claim 40 is also rejected under §112, ¶ 2, because the examiner asserts that the language "powder mixture having doped yttrium aluminum perovskite" is indefinite. Accordingly, claim 40 is amended, thus these rejections under §112 should be removed.

Claims 1-20, 22-38, and 49, 50 are rejected as indefinite under §112, ¶ 2, because the examiner asserts it is unclear what is being produced by the claimed methods. To overcome this rejection, the preamble of independent claims 1 and 22 are amended, and new claims 49 and 50, which correspond to canceled claims 21 and 39, respectively, are added.

Claims 1 and 22 are rejected as indefinite under §112, ¶ 2, because the claims did not include the step of adding water to form the aqueous mixture. The amended claims now recite this step, thus the rejection should be removed.

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Rejections under 103(a)

Claim 1-20, and 49 are rejected under 35 U.S.C. § 103 in view of Greskovich and Pederson. These cited references, singularly or in combination, do not teach or suggest, all elements of amended claim 1, thus these claims should be in condition for allowance.

Amended claim 1 recites, *inter alia*, a method comprising the steps of: combining at least one salt of aluminum with at least one salt of yttrium, dissolving the yttrium and aluminum in water to form an aqueous mixture with a mole ratio of 3:5 yttrium to aluminum in the mixture, adding at least one reducing agent and at least one auxiliary oxidizing agent to the mixture, heating the mixture to a first temperature such that the mixture undergoes combustion and a powder is formed, and calcining the powder at temperatures greater than 700 °C to about 1000 °C for an amount of time sufficient to form single phase cubic yttrium aluminum garnet.

Pederson is cited for teaching a method of forming metal oxide ceramic powders by combining stoichiometric amounts of salts, such as aluminum and yttrium, in an aqueous mixture. Pederson also is cited for teaching adding amounts of amino acid and an ammonium nitrate to the mixture, heating the mixture at a temperature such that the mixture undergoes combustion and forms a powder, and then calcining the powder to form the ceramic. As the examiner concedes, Pederson does not teach a powder comprising single phase cubic YAG.

To cure this noted deficiency, the examiner combines the teachings of Pederson and Greskovich. The examiner asserts that Greskovich teaches the formation doped YAG ceramics, thus the examiner, through hindsight reconstruction, contends that one skilled in the art would know to form YAG powders in Greskovich according to the method of Pederson.

The examiner errs in citing Pederson for teaching calcining at temperatures between greater than 700 °C to about 1000 °C to form single phase cubic yttrium aluminum garnet.

Pederson teaches calcination at temperatures of 700 °C or less. (col. 5, lines 9-11). The examiner concedes that Pederson does not teach the claimed calcination temperature range by stating that Pederson "exemplifies calcining at 700 °C or less". (*Office Action* (6/21/05), page 4). In addition, Greskovich also fails to teach calcining at temperatures ranging from greater than 700 °C to about 1000 °C for a time sufficient to form a powder comprising single phase cubic YAG. Thus, neither reference, singularly nor in combination, teaches this claimed element as required in MPEP 2143.

Moreover, there is no teaching or suggestion in the references that would lead one of ordinary skill in the art to modify the Pederson reference to teach this claimed temperature range. Although references may be modified, the resultant modification does not establish obviousness unless the prior art also suggests the desirability of the modification. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). In our case, none of the cited references provide a motivation to modify the temperature range of Pederson to teach the claimed temperature ranges of above 700 °C. In fact, Pederson emphasizes that high temperature calcination is undesirable, because high temperature calcining promotes crystal growth. (col. 1, lines 34-37). In essence, the prior art suggests to one skilled in the art that the calcining temperature ranges of Pederson should not be modified to teach the claimed invention, because the higher temperatures promote crystal growth. As a result, there is no teaching or suggestion to modify the temperature range of Pederson to teach the calcining temperature range of the claimed invention.

Moreover, the prior art teaches away from modifying the Pederson reference to teach this claimed temperature range. "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, ... would be led in a direction divergent from the path that was taken by the applicant." *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 1360, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999). As stated above, Pederson states that high temperature calcination is undesirable, because it promotes crystal growth. Consequently, the Pederson reference would caution one of ordinary skill against modifying Pederson's calcining range of below 700 °C. Accordingly, the prior art teaches away from modifying Pederson's calcination method.

Moreover, the examiner asserts that Pederson teaches the claimed calcination temperature range statement, because the examiner contends Pederson constitutes a general calcination teaching reference. The examiner cites Pederson for teaching a "calcination temperature range sufficient to convert the ash resulting from the combustion process to the desired material and to drive off any remaining organic residues." (*Office Action*, page 5). However, through hindsight reconstruction, the examiner overreaches in her reading of Pederson. Although Pederson teaches some of the products of calcination i.e. converting ash and driving off organic residues, Pederson does not disclose a "calcination temperature range sufficient" to achieve these products. Pederson's teachings of calcining temperature ranges are limited to the disclosure of a temperature range of 700 °C or less.

Even if Pederson constitutes a general teaching reference, as the examiner contends, the reference still fails to teach the claimed temperature range. By relying on Pederson's general calcination teachings to teach specific calcining process parameters, the examiner is applying an improper "obvious to try" argument in support of the obviousness rejection. *See* MPEP

2145(X)(B) "One cannot base obviousness upon what a person skilled in the art might try or might find obvious but rather must consider what the prior art would have led a person skilled in the art to do." *In re Tomlinson*, 150 USPQ 623 (CCPA 1966). An improper 'obvious to try' rationale is being applied when one skilled in the art would have to "try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful". *See* MPEP 2145(X)(B).

Here, Pederson provides no indication of what calcination temperature range will be successful to form single phase cubic yttrium aluminum garnet. Thus, one of ordinary skill in the art must experiment with temperature ranges, without any suggestion or teaching in the references of what temperature ranges are likely to be successful in producing single phase YAG. Because neither references teaches calcination to produce YAG powder, there is even more unpredictability. Thus, the prior art provides no reasonable expectation of success in modifying the Pederson reference to teach the claimed calcination temperature ranges of the present invention.

The examiner further errs, because Greskovich fails to teach the formation of YAG ceramics from YAG powders. According to the MPEP 2143, the prior art reference or references when combined must teach or suggest all the claim limitations. In our case, Greskovich fails to teach YAG powders. Greskovich generally mentions YAG as a type of transparent polycrystalline garnet; however, Greskovich only teaches methods making gadolinium garnet ceramics from gadolinium powders. *See* examples 1-4. In fact, Greskovich states that "[w]hile attempts have been made to produce transparent polycrystalline YAG, such attempts have not been successful." (col. 9, lines 31-33). Since Greskovich fails to teach methods of producing

transparent polycrystalline YAG, Greskovich also fails to teach the raw materials used to produce transparent polycrystalline YAG i.e. YAG powder.

Furthermore, Greskovich teaches away from producing YAG powders according to the method of Pederson. As stated above, Greskovich teaches that producing transparent polycrystalline YAG is unsuccessful. As a result, Greskovich suggests to one skilled in the art that YAG powders should not be produced according to the method of Pederson, because the YAG powders cannot be subsequently used to produce transparent polycrystalline YAG. Thus, the prior art teaches away from combining the teachings of Greskovich and Pederson.

In regards to claim 15, none of the cited references teach or suggest the following claimed ratio: (Reducing Agent (*Alanine*) + Auxiliary Oxidizing Agent (*Ammonium Nitrate*)) / (Y + Al) =1.4 to 1.5. In contrast, Pederson teaches the following ratio of Amino Acid/Metal Cation = 0.5 to 6. Pederson does not teach a ratio, which incorporates an oxidizing agent such as ammonium nitrate as in the claimed ratio, thus claim 15 is in condition for allowance.

Accordingly, the examiner has not established a prima facie case of obviousness in light of Greskovich and Pederson. As the examiner concedes, none of the cited references, either singularly or in combination, teach or suggest calcining "at temperatures between greater than 700 °C to about 1000 °C for an amount of time sufficient to form single phase cubic yttrium aluminum garnet." In addition, none of the cited references teach or suggest a powder comprising YAG. Moreover, the prior art provides no motivation or reasonable expectation of success in combining the references to teach the claimed temperature range or the YAG powder. In fact, the prior art teaches away from modifying the prior art teachings. Thus, a prima facie case has not been established, and claim 1 and its dependent claims 2-20 and 49 are in condition for allowance.

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The Applicants respectfully submit that, in view of the above amendments and remarks, the application is now in condition for allowance. The Examiner is encouraged to contact the undersigned to resolve efficiently any formal matters or to discuss any aspects of the application or of this response. Otherwise, early notification of allowable subject matter is respectfully requested.

Respectfully submitted,

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